

Team composition, structure, members' gender influence ability to focus, work together

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The ability of team members to work together across a range of tasks, called collective intelligence (CI), varies significantly between teams.

Research suggests that the level of collective attention (the quality and coordination of members' focus) a team develops influences its level of CI. A new study examined what factors enhance collective attention, focusing on the influence of teams' hierarchy and its interaction with teams' gender composition.

Applying some novel analytic techniques using algorithms to analyze speaking [patterns](#), the researchers found that teams with a stable hierarchy (i.e. a leader whose position was not being challenged) exhibited more cooperative, synchronous speaking patterns, while teams with an unstable hierarchy (i.e., the leader's position was subject to potential change) or unspecified hierarchy (i.e. without a leader) exhibited more competitive, interruptive speaking patterns. Whether cooperative or interruptive speaking patterns were associated with greater levels of CI depended on the teams' gender composition, with female-dominated teams benefiting from cooperative speaking patterns and male-dominated teams benefiting from competitive speaking patterns.

The study, by researchers at Carnegie Mellon University, Johns Hopkins University, Northeastern University, and Korea University, is published in *Organization Science*.

"We sought to determine whether the same team structures and patterns of interaction benefit all teams, regardless of the characteristics of their members, or only those whose structures and patterns matched members' preferred patterns of collaboration," explains Anita Williams Woolley, Associate Professor of Organizational Behavior and Theory at CMU's Tepper School of Business, who led the study. "We also wanted to know whether CI can be encouraged through team design. We found that both a teams' composition and how they are structured jointly influence [collective attention](#) and collective intelligence."

CI has been shown to predict performance in a variety of different contexts, including teams working in consulting, the military, software development, and online games.

In this study, researchers recruited 600 individuals from a mid-Atlantic U.S. university's research participant pool for a two-hour study on group behavior. They randomly assigned participants to work in about 150 stable, unstable, or unspecified hierarchical teams, and they varied the gender composition of each team. They examined how team structure led to different behavioral manifestations of collective attention, as seen in verbal communication patterns.

To establish the hierarchical condition of the teams, in some teams, members voted for a leader, then were told that the leader would continue in that role for the duration of the study (stable hierarchy) or that the group would be able to vote the leader out at a later part of the study (unstable hierarchy); some teams did not vote for a leader (unspecified hierarchy). The teams then completed a CI test. Participants wore microphones to capture their communication, and then the researchers applied some novel analytic techniques using algorithms to capture interactional synchrony and competitive interruptions.

Teams with a stable hierarchy displayed more cooperative speaking patterns, with team members speaking in coordinated ways. In contrast, teams with an unstable hierarchy or with no specified hierarchy exhibited more competitive speaking patterns, with individuals more likely to interrupt others.

The effect of these cooperative and competitive speaking patterns on CI depended on the gender composition of the teams: Majority-female teams had higher CI when their speaking patterns were more cooperative and synchronous, while all-male teams had higher CI when their speaking patterns were more competitive and featured more

interruptions. Thus, based on the gender composition of the teams, effective communication for one team did not necessarily look like effective communication for another.

"Hierarchy in and of itself is neither good nor bad for team functioning, but its benefits derive, at least in part, from its ability to enhance collective attention," says Rosalind Chow, Associate Professor of Organizational Behavior and Theory at CMU's Tepper School of Business, who co-authored the study. "Moreover, it's not just that [hierarchy](#) can affect team processes, but also how team members respond to team processes that informs team performance. In our case, we show that team responses to a team process depend on the team's composition."

The study's authors note that their results, based on a short lab-based assessment, may not generalize to longer-term work collaborations in other settings. That said, the strength of participants' response to these conditions when working for a short time with a group of strangers was surprising, and the researchers speculate that analogous situations in an organization where people's careers are at stake could be even stronger.

"Our findings add to a growing body of evidence that a team's level of collective attention provides an important basis for collective intelligence to develop," says Woolley. "Organizational leaders who understand the mechanisms and know their team members can proactively design [teams](#) to improve collective attention and help them develop high levels of [collective intelligence](#)."

More information: Anita Williams Woolley et al, Collective Attention and Collective Intelligence: The Role of Hierarchy and Team Gender Composition, *Organization Science* (2022). [DOI: 10.1287/orsc.2022.1602](https://doi.org/10.1287/orsc.2022.1602)

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